Space Weather Forecast

Issued on Friday, 26 April 2024 at 01:13 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate flares (R1/R2 blackouts) expected. Chance of isolated G1/Minor Geomagnetic Storm intervals from Coronal Mass Ejection (CME) or fast wind effects Days 1-2 (26-27 Apr).

Solar Activity: Activity is currently Moderate with several Moderate-class flares observed in the past 24 hours. The largest of these occurred at 25/1712 UTC from the large complex that straddles the southwest limb. This broad cluster of regions carry a large percentage of the current flare risk, with the spots magnetically connected and a large amount of flux associated with them, suggesting a potential for Strong flares. However, this group is becoming increasingly difficult to analyse due to its location on the disc. There are currently fourteen regions on the visible disc. Of these, a region in the northwest has developed magnetic complexity. A relatively large region in the southeast is exhibiting minor magnetic complexity.

Multiple Coronal Mass Ejections (CMEs) have been observed in coronagraph imagery over the previous 24hrs, with some potential for the odd glancing blow at Earth. A prominence eruption across the eastern limb at 25/1100UTC has produced a CME but this is not expected to have an Earth-directed component.

Solar Wind / Geomagnetic Activity: Solar winds were at background levels. Wind speeds have gradually declined from 340km/s and are currently around 300 km/s. The Interplanetary Magnetic Field was weak, with the north-south component also varying weakly, but has been predominantly negative (southward) oriented since 25/0500UTC. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected to continue at first, with a very slight chance of isolated Strong flares Day 1 (26 Apr). The complex cluster of regions in the southwest will fully rotate off the disc late on Day 1 (26 Apr). The flare risk is then expected to decline during Day 2 (27 Apr) and Day 3 (28 Apr) as these regions rotate well away from the west limb. There remains a flare risk from other regions on the visible disc however, with the chance of Moderate flares continuing throughout.

Solar Wind / Geomagnetic Activity: There is a risk of CMEs passing close to Earth throughout the period, largely missing ahead and to the south of our orbit. The greatest potential for any impacts is thought likely to be later Day 1 into early Day 2 (26-27 Apr). Solar winds are currently at background levels with enhancement from two coronal hole fast winds expected to connect during Days 1-2 (26-27 Apr). Although an additional enhancement from a further stream of coronal hole fast winds is possible late Day 2 (27 Apr). The combined contributions are likely to result in an increase in wind speeds during this period, perhaps reaching 500-550 km/s.

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Moderate confidence in wind speeds as the coronal holes are persistent features and were present on the last rotation resulting in an uptick in wind speeds to Elevated levels.
Geomagnetic activity is likely to be Quiet to Unsettled (Kp 0-3) at first. This has the potential to become Unsettled to Active (Kp 3-4) with a chance Days 1-2 (26-27 Apr) of G1/Minor Storm (Kp 5) intervals, either under Coronal Mass Ejection (CME) or fast wind influence, or perhaps a combination of both. The risk should decline into Day 3 (28 Apr), becoming mostly Quiet by Day 4 (29 Apr).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to persist at background levels, but with a slight chance of reaching the S1/Minor Radiation Storm level throughout this period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	25	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	60	40	30
Very Active	R3 to R5 X	No	15	10	5	5

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	15	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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